

CLAIMS

1. A tunable optical filter comprising a narrowband tunable filter array deposited on an inside surface of a first and second substrate, and, a reflective coating deposited on an outer surface of each substrate.
2. The tunable optical filter of claim 1, further comprising a patterned hole in at least one reflective surface to allow a light signal to pass.
3. The tunable optical filter of claim 1, wherein the narrowband tunable filter is a liquid crystal device.
4. The tunable optical filter of claim 1, further including a quarter wave reflective rotator on an outer surface of at least one of the substrates.
5. The tunable optical filter of claim 1, wherein the narrowband tunable filters are bi-directional devices that pass a transmission band and reflect a passband.
6. The tunable optical filter of claim 1, wherein each narrowband tunable filter further is individually controlled by an application of voltage to an electrode layer associated therewith.

7. The tunable optical filter of claim 1, wherein the narrowband tunable filters are configured with slightly different center wavelength resonant frequencies.

8. The tunable optical filter of claim 2, wherein at least one hole is positioned at the input of the device.

9. The tunable optical filter of claim 2, wherein at least one hole is positioned at the output of the device.

10. The tunable optical filter of claim 7, wherein the narrowband tunable filter array further including a common electrode layer.

11. The tunable optical filter of claim 10 wherein the device is tuned by an application of voltage to the common electrode layer.

12. A tunable optical filter comprising N stages, each stage comprising a narrowband tunable filter array deposited on an inside surface of substantially parallel first and second substrate each of which first and second substrates having a reflective coating deposited on an outer surface.

13. The tunable optical filter of claim 12, wherein the pixels are aligned in a single row or column along the length of the substrate.

14. The tunable optical filter of claim 12, wherein the pixels are aligned in a single row and column along the length and width of the substrate.

15. The tunable optical filter of claim 12, wherein an optical signal input to the filter will be split into a transmission band and a passband signal.

16. The tunable optical filter of claim 13, wherein each stage further includes holes which allows a group passband signal to enter and exit.

17. The tunable optical filter of claim 13, wherein at least one stage has associated therewith array members of the narrowband tunable filter grouped into sectors.

18. The tunable optical filter of claim 17, wherein each sector associated with said stage produces a group passband output.

19. The tunable optical filter of claim 18, wherein at least one of said sectors produces a group transmission output which couples to an input of another of said sectors.

20. The tunable optical filter of claim 19, further including a MUX for combining group passband signals.

21. The tunable optical filter of claim 20, wherein the MUX includes an integrated photodetector tap.

22. A tunable optical filter comprising,
a narrowband tunable filter array deposited on an
inside surface of a first and second substrate, and a
reflective coating deposited on an outer surface of
each substrate, and,
a temperature compensation means for controlling the
tunable optical filter.